

square miles as now estimated, to institute efficient systems of observations and warnings, &c., &c. Prof. Riley treats on the natural enemies of the locust, and illustrates the chapter by a remarkably well-executed plate. The general conclusion arrived at is that the evil may be materially modified, although utter extermination is out of the question.

The lengthy appendices give replies to the official circular from those interested, in widely-separated districts, often showing great practical and frequently scientific knowledge, sometimes combined with the illogical conclusions at which agriculturists often jump. Then there is a list of species of locusts, &c., collected in the Western States in 1877, with descriptions of new species, worked out by Mr. Scudder; the plate illustrating this is not so good as usual, and scarcely sufficient for scientific purposes. A general bibliography of locusts (chiefly compiled by Mr. B. Pickman Mann), from 1542 forwards, must have occasioned great labour, and is correspondingly valuable. Other appendices treat on the flight of locusts (translated from the Italian); on a journey to Utah and Idaho, by Dr. Packard; and a translation of Yersin's researches on the function of the nervous system in Articulates. The six large folded maps on thick paper seem to be admirably adapted to illustrate the points to which each is directed.

We do not think it is pretended that some of the most useful chapters from a scientific point of view have any special, or even indirect, bearing upon the subject of Economic Entomology. The investigation of a locust's brain, for instance, will hardly reveal the mental condition of the insect, and show us why it is prompted to migrate or be so maliciously inclined towards destroying the hopes of the agriculturist. We prefer to regard these portions of the report as an outcome of a liberal endowment of research, the application of which to the nominal subject for inquiry is not too rigidly enforced.

#### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

#### Laurentian Gneiss of Ireland

ALLOW me to state that since writing the notice which appears in NATURE (vol. xxiv, p. 81), I have found that white crystalline marble has been described by Sir R. I. Murchison and Prof. Geikie as occurring in the Laurentian gneiss of Loch Maree, in Scotland. I had overlooked this statement, and was under the impression that limestone was absent from the Scottish Laurentian area. Its occurrence in both countries constitutes an additional point of resemblance.

EDWARD HULL

Geological Survey of Ireland, May 31

#### Resonance of the Mouth-Cavity

WILL you give a place in NATURE to the inclosed letter which has just reached me? The writer is an organist and teacher of music of great repute in the North of England. The experiments which he describes will, I believe, interest many of your readers as much as they do me.

Trinity College, Cambridge, May 20 SEDLEY TAYLOR

MY DEAR SIR,—Travelling the other day by express from Scarborough to London, I found myself unconsciously moving my lips as if whistling a tune, which however I was not actually doing. Without any other action than the simple movement of the lips, I very distinctly heard different sounds in my mouth. Persevering in the practice of this discovered power of producing sound, I soon accomplished a fairly satisfactory performance—audible only to myself—of "Home, sweet home."

As soon as the train came to a standstill I found myself

powerless to repeat the performance, for there was then no response to the contortions which by this time had attracted the attention of my fellow-passengers, who doubtless thought that I was being conveyed to a lunatic asylum. On resuming our former speed the "power of sound" once more responded to my efforts.

At once I perceived that I had made a discovery of which I had never heard or read in any of the numerous works on acoustics that I have studied. I perceived that I could sing out different sounds from the noise of the train by a simple alteration of the size of the resonance-cavity of my mouth.

On my return home it occurred to me that the force of vibration in the air from the note of a harmonium might be able to set up a sympathetic resonance of the mouth. To my delight I found that I was right.

It is known that if a tuning-fork of proper size be held to the open mouth the latter can be so shaped as to give a powerful resonance; but I believe it is not known that the mouth for *any* sound (above about middle C to  $f''$  or  $g''$ ) is able to give a very distinct resonance.

Further experiments showed me that not only can the primes of notes within this limit be heard, but that any of these sounds are very clearly heard when they are upper partials of low notes.

This can be tested at the harmonium. Holding down, say, G on the first line of the bass, the third and following partials up to about the fifteenth, can be most clearly heard. The same held good when I experimented with men's and boys' voices.

But the most striking results were obtained at the organ. Holding the low C of the 8 ft. trumpet, the partials from  $e'$  to  $f''$  were most bright and clear. Other stops, according to their several qualities, yielded corresponding results. I tried in vain however to obtain resonance for a differential and summational tone.

When the upper partials of a compound sound are generated in the mouth, the sounds are so near that with careful adjustment beats come out very clearly.

It is well however to observe that the force or weakness of any single sound thus obtained depends greatly upon the distance from the source.

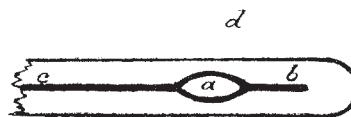
JOHN NAYLOR  
Scarborough, May 13

#### Suggestion Relating to the Kew Standard Thermometers

I SHOULD like to suggest, through your columns, two slight changes in the manufacture of the Kew standard thermometers, which I think will commend themselves to any observers who often have occasion to use these beautiful instruments.

1. The calibrating chamber at the top of the thermometer is now made as in the figure, where  $c a b$  is the capillary column which expands at  $a$  into the calibrating chamber. Instead of being rounded off at  $d$  the capillary column is continued a short distance to  $b$ . This causes serious inconvenience in the transportation of the instrument, or in its calibration, because a small particle of mercury readily detaches itself from that in the chamber  $a$ , and once in  $b$  with a cushion of air between it and the remainder of the column, nothing but heat will dislodge it.

It does not require very great skill on the part of the glass-blower to form the chamber  $a$  by means of the pressure of the



mercury itself against the walls of the capillary column. The glass-blower, as is perhaps well known, can soften the finished tube at  $a$ , and while the glass is in this condition the gentle application of the flame to the bulb will force the mercury into the part at  $a$ , and the careful application of both flames will then form a pear-shaped cavity of a form which will not retain a particle of mercury, and is exceedingly convenient in use.

2. It is often desirable to hang these thermometers in a comparator or other place, and it would facilitate this if a glass ring were attached to the upper end, as is the case with the ordinary chemical thermometers. It is to be observed that the plane of this ring should be parallel to the enamelling in the tube.

It is often convenient to know the kind of glass used in the

tube, and the date of filling. Something more exact than the commercial name of the glass would be needed in stating the former, but both of these particulars might with propriety be engraved on the tube.

LEONARD WALDO

Yale College, New Haven, May 11

#### "How to Prevent Drowning"

ONE further hint may be added to those of Mr. MacCormac. It is as simple as practical, although it may not have been before recommended in print.

When a person is thrown into the water from an elevation the body sinks for a time, and may not rise quickly to the surface to permit fresh breath to be taken. In that case shut the lips firmly to prevent the escape of the breath, and swallow the breath. This is the art of the diver; it comes naturally to him when he seeks to prolong his stay under water; but it may not as readily occur to one unskilled in diving, whose only desire is to reach the surface. The act of gulping down the breath may be repeated three or four times, and thus protract the chances of escape.

Although every one may tread water, fresh or salt, Mr. Hill is undoubtedly right in saying that all cannot float upon fresh water without assistance from their hands or feet. Not one in ten can do so. When the swimmer shows his toes above the surface his hands are in constant action below, turning half-way round from the wrist and back again, to change the fulcrum.

W.M. CHAPPELL

Stratford Lodge, Oatlands Park, Weybridge Station

THE bathing—I might almost say the drowning—season is now about to begin, and many lives will unhappily be lost. As the human frame, bulk for bulk, is lighter than water, all that is needful to save life is to permit the body to sink until it shall displace as much water as equals the body's weight. Then paddle gently, as the lower animals do, with hands and feet, the head being held erect, wherever it is desired to go. This direction being carried out is absolutely all that is needful under ordinary conditions to preserve life. These few directions ought to be stuck up in every bathing-place—every boating- and skating-place—in the three kingdoms. Children in every instance ought to be made to tread water from the earliest age, say in shallow slate baths with blood-warm water, or, when convenient and suitable, in some river, pond, or in the open sea. A leather belt with ring, and a stout rod with line and hook, are employed by Portuguese mothers to instruct their children. The mother, rod in hand, stands on the brink; the child learns in the water. In Paris swimming-schools the same procedure is resorted to. The business cannot be begun too soon. I saw mere infants sustaining themselves perfectly in the tepid waters of Africa. Treading water is far safer than swimming in a broken sea. Every adult, man or woman, who has not practised it should begin. Once the conviction instilled that the body is lighter than water, the risk of drowning is reduced to zero. The process involves no uncertainty, no delay. Very different from swimming, it can be acquired at once.

Belfast, May 25

HENRY MACCORMAC

#### Optical Phenomenon

MR. MURPHY'S experience, described in NATURE, vol. xxiv. p. 80, is general enough. It was observed by Fechner in 1860, and is now commonly associated with his name, though Prof. Brücke of Vienna had also seen and explained the very same phenomenon some years before that. Nor was he the first, for, according to Aubert, there is a still earlier account due to Brewster in *Poggendorff's Annalen* for 1833.

Fechner's side-window experiment, as it is called, is best seen by employing a scrap of white paper on a black ground, or *vice versa*, the eyes being accommodated for some other distance, so that double images of the paper are secured. Care must also be taken that the light from the window enters the nearer eye only through the sclerotic, so as to receive a reddish tinge. This diffused reddish light renders the eye after a short time comparatively insensitive to red, so that the light reflected from the white paper appears greenish, the black paper alone, from which no light is reflected, appearing of the reddish tinge. In contrast with this, in the other eye, which is sheltered by the nose from the window-light, the white light appears reddish, and the black greenish. Some little time is required for the illuminated eye

to be exhausted for red before the contrast is very striking. Such is Brücke's explanation; but who will explain to us this "subjective phenomenon of contrast"?

JAMES WARD

Trinity College, Cambridge, May 29

#### An Optical Illusion

IF your correspondent, Mr. William Wilson, will refer to vol. xxxiii. of the "International Scientific Series," page 86, he will find given by Prof. Le Conte a full description and explanation of the ocular illusion to which he refers in his letter (NATURE, vol. xxiv. p. 53). The explanation is identical with that given by yourself.

SAMUEL DREW

Chapelton, Sheffield, May 24

#### Occurrence of Neolithic Implements at Acton, W.

IT may interest your readers to know that I discovered, last week, on the surface of a field south of the Priory at Acton, an abundance of Neolithic implements, precisely similar as regards form, type, size, and material to those which occur so abundantly in the neighbourhood of Beer and Sidmouth, in Devonshire. They occur also on a large field on the hill at Acton, west of the Willesden Railway, and are formed of grey or black chalk flints, which—or the implements—have been imported. On a field south of the Priory I found a flat, circular, grey, quartzite, beach pebble, derived possibly from the Bunter Conglomerate of South Devon, similar to those of the Dorsetshire and Devonshire coasts. Such pebbles are of frequent occurrence on the surface of the fields in the Neolithic districts of Beer and Sidmouth, and have been used as hammer stones and missiles. The association of this pebble with implements so like in every respect to those of South-East Devonshire is very remarkable.

The occurrence of paleolithic implements in the drift of Acton has been known for some years. They occur in remarkable abundance in the high level gravels of this locality as well as in the low level gravels of Hammersmith, and one cannot fail to find in newly-spread gravel examples of the minor implements, such as flakes, drills, &c., and occasionally larger implements. A series of the neolithic implements of Acton I purpose depositing in the Jermyn Street Museum. Their discovery at this locality confirms the conjecture I had formed that neolithic implements might occur in the Thames Valley, from having found implements of neolithic type in the drift, into which they may have got washed.

SPENCER GEO. PERCEVAL

21, Notting Hill Square, W., May 20

#### Birds Singing during Thunder

A THUNDER-STORM of great severity passed over us, travelling round from west to south, between 4 and 8 o'clock p.m., May 28, and killing a man in the open air three miles from my residence. The thermometer stood about 70° all the while. During the storm, and even when the thunder-peals were loudest, the chaffinches kept singing, and the blackbirds' notes alternated with the thunder-claps. The rain was moderate, and as the air filled with insects and perfume, the swallows kept busily, skimming even while forked lightning was flashing. Horses in the fields however exhibited symptoms of terror.

J. SHAW

Tynron, Dumfriesshire

#### Fire-Balls

I HAVE read with great interest Prof. Tait's lecture on Thunderstorms, and have had recalled to mind a singular fire-ball which I had the fortune to see some years ago during a thunderstorm in Portugal. I have a perfect recollection of the phenomenon without referring to my journal of that date.

I was standing in a window on the second floor of the Hôtel Braganza (in Lisbon), which stands close to and high above the Tagus, and had an unbroken view of the river. There occurred a flash followed by an instantaneous crash, but the tail of the flash, however, gave origin to two balls, which descended separately and not far apart, towards the river, and when quite close to, or in contact with the water, burst in rapid sequence, with explosions which might have been the crack of doom.

HENRY O. FORBES

#### Sound-Producing Ants

IN NATURE, vol. xxii. p. 583, which has lately reached me, I read a letter from Mr. Peal on sound-producing ants, and I